
Chapter 7A

Photosynthesis: Using light energy to make food

Reviewing concepts and Vocabulary

1. During the general process of photosynthesis, _____, _____
and _____ react to form the products _____ and _____.
2. The substance that colors plant leaves, flowers, and fruit is called _____; it produces color by _____ light.
3. The two molecules that temporarily store light energy transferring it to the Calvin cycle are _____ and _____.
4. The products of the breakdown of ATP are: _____ and _____.
5. The main function of NADPH is:

6. What causes an electron in a chlorophyll molecule to become “energized” or “excited”?

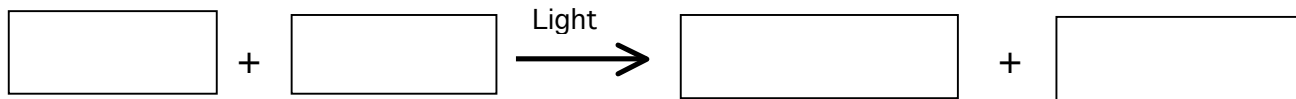
7. How does water serve as a vital function in photosynthesis?

8. What is the chemical formula for glucose?

9. What is the equation for photosynthesis?

10. In an experiment, plants were grown under colored filters that allowed equal amounts of light of different colors to strike different plants. Under which filter do you think plants grew the slowest? Why?

11. Write the overall equation for photosynthesis in the boxes below. Show the substances used on the left, and those produced on the right. Use different colors for carbon, hydrogen, oxygen in carbon dioxide, and oxygen in water, and then use your color code to show where atoms of C, H, and O on the left end up in the products on the right. On the lines under the substances used, state which is oxidized and which is reduced.



12. Complete the following table summarizing photosynthesis:

	<i>Light Reaction</i>	<i>Calvin Cycle</i>
Energy Source		
Inorganic compounds required		
Products		

13. Refer to the equation and diagrams of photosynthesis in your book to match each of the phrases on the right with one of the ingredients or products listed on the left.

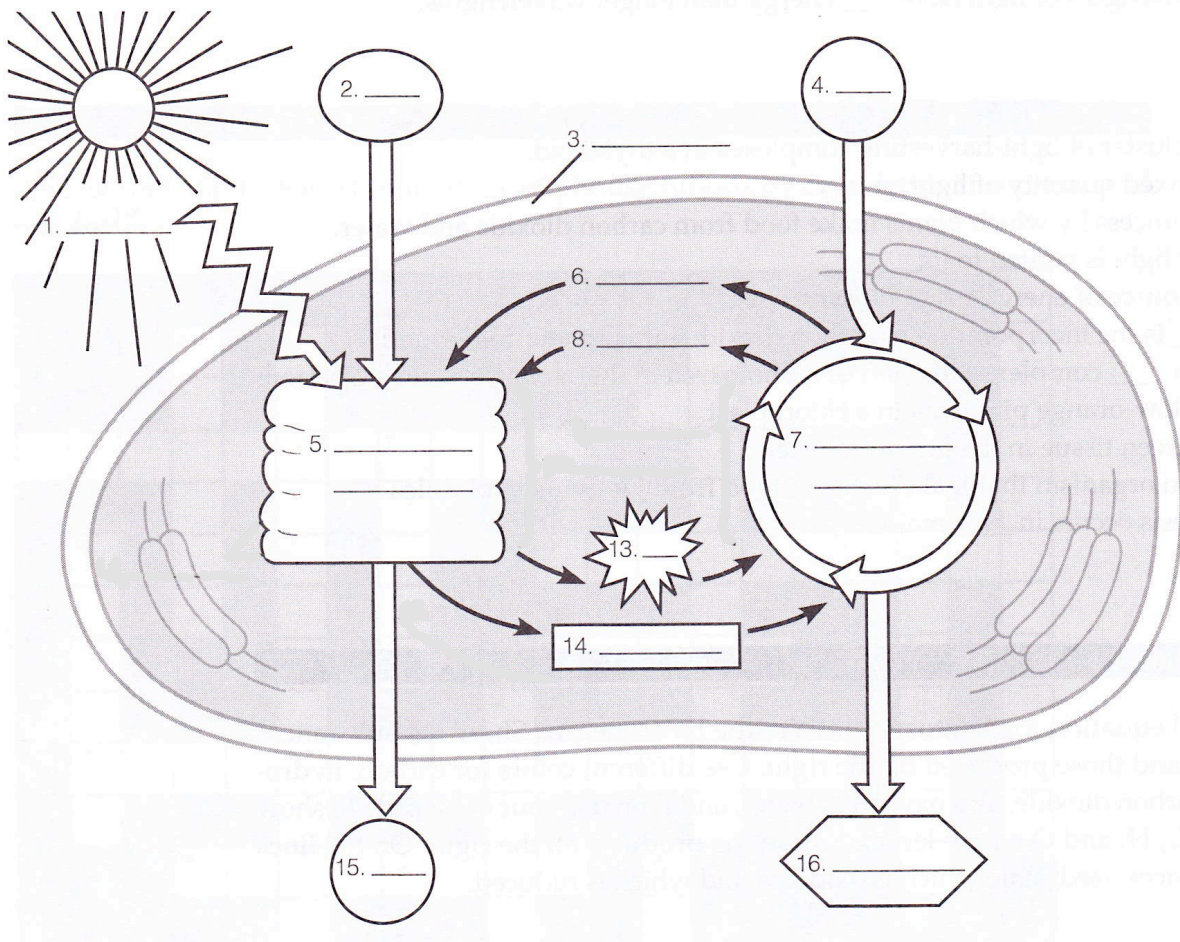
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|--|----------------------|
| _____ Oxidized in the light reaction | A. Carbon Dioxide |
| _____ Reduced in the Calvin cycle | B. Water |
| _____ Carries H and electrons from the light reactions to the Calvin cycle | C. Glucose |
| _____ Food produced by the Calvin cycle | D. Oxygen |
| _____ Source of H and electrons that end up in glucose | E. ADP + P |
| _____ Source of O atoms than end up in glucose | F. ATP |
| _____ Where O atoms of water end up | G. NADP ⁺ |
| _____ Oxidized in the Calvin cycle | H. NADPH |
| _____ Reduced in the light reaction | I. Light |
| _____ Supplies energy to the Calvin cycle | |
| _____ Where C and O atoms in carbon dioxide end up | |
| _____ Recycled from the Calvin cycle to make ATP | |
| _____ Supplies energy to the light reactions | |

Multiple Choice Select the best answer

- _____ 14. What is the name given to organisms that can make their own food and the food for the biosphere?
- A) manufactures
 - B) producers
 - C) synthesizers
 - D) heterotrophs
 - E) Chemotrophs
- _____ 15. Autotrophs that utilize light as their energy source are
- A) Photoautotrophs
 - B) fungi
 - C) consumers
 - D) chemosynthetic autotrophs
 - E) heterotrophs
- _____ 16. Which of the following are produced during the light reactions of photosynthesis?
- A) ATP, NADPH, CO_2
 - B) glucose, ADP, NADP^+
 - C) ADP, NADP^+ , O_2
 - D) glucose, ADP, NADP^+ , CO_2
 - E) ATP, NADPH, O_2
- _____ 17. What is the source of energy that provides the boost for electrons during photosynthesis?
- A) ATP
 - B) electromagnetism
 - C) light
 - D) cellular respiration
 - E) glucose
- _____ 18. Which of the following are produced during the Calvin cycle?
- A) glucose, ADP, NADP^+
 - B) ATP, NADPH, CO_2
 - C) glucose, ADP, NADP^+ , CO_2
 - D) ADP, NADP^+ , O_2
 - E) ATP, NADPH, O_2
- _____ 19. Why are most plants green?
- A) Chlorophyll *a* reflects green light
 - B) Chlorophyll *a* absorbs green light
 - C) All photosynthetic pigments are colored green
 - D) Chlorophyll *b* primarily uses green light as the source of energy for photosynthesis
 - E) Green helps plants blend into their environment as a sort of camouflage

20. Photosynthesis has been called “the most important chemical process on Earth.” Explain why.

21. In the spaces below, label this diagram summarizing the two stages of photosynthesis. Include **outer membrane of chloroplast**, **light reactions**, **Calvin cycle**, **light**, **H₂O**, **O₂**, **NADPH**, **ATP**, **CO₂**, **glucose**, **ADP + P**, and **NADP⁺**. (Note: 5 and 7 are processes, 3 is a place or structure, and the rest are inputs and outputs)



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

13. _____

14. _____

15. _____

16. _____